MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2022/23

ETN4116 – ADVANCED NETWORKING TECHNIQUES

(TE)

03 JULY 2023
09:00 a.m. – 11:00 a.m.
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This Question paper consists of 7 pages (including this cover page) with 4 Questions only.
2. Answer **ALL** questions. All questions carry equal marks and the distribution of the marks for each question is given.
3. Please print all your answers in the Answer Booklet provided.

Question 1

(a)

(i) For a communication session between a pair of processes, which process is the client and which is the server?

[2 Marks]

(ii) For a P2P file-sharing application, do you agree with the statement, "There is no notion of client and server sides of a communication session". Explain your reason.

[2 Marks]

(iii) Suppose you wanted to do a transaction from a remote client to a server as fast as possible. Explain why you would use either UDP or TCP?

[3 Marks]

(iv) Why do HTTP, SMTP, and POP3 run on top of TCP rather than on UDP?

[3 Marks]

(v) In real world implementation, many operators block UDP traffic at their firewalls. Explain the statement.

[3 Marks]

(b) Consider an e-commerce site that wants to keep a purchase record for each of its customers.

(i) Describe how this can be done with cookies.

[3 Marks]

(ii) Describe how Web caching can reduce the delay in receiving a requested object.

[2 Marks]

(iii) Will Web caching reduce the delay for all objects requested by a user or for only some of the objects?

[2 Marks]

(c) In BitTorrent, suppose Alice provides chunks to Bob throughout a 30-second interval.

(i) Will Bob necessarily return the favour and provide chunks to Alice in this same interval? Why or why not?

[3 Marks]

(ii) Consider a new peer Azwani that joins BitTorrent without possessing any chunks. Without any chunks, she cannot become a top-four uploader for any of the other peers, since she has nothing to upload. How then will Azwani get her first chunk?

[2 Marks]

Continued.....

Question 2

(a)

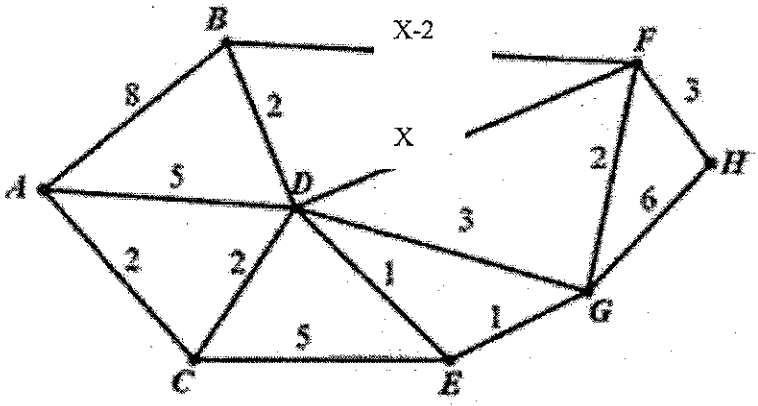

Figure Q2a

With reference to **Figure Q2a**, answer the following questions:

(i) Explain similarities and difference between distance vector and link state algorithm.
[4 marks]

(ii) Complete node A routing table if the routing is using Dijkstra routing algorithm when X=2.
[3 marks]

(iii) Complete node A routing table if the routing is using Dijkstra routing algorithm when X=5.
[3 marks]

(iv) If the links between node C and D, and the link between D and E are now broken, update routing table for Node A, using Dijkstra routing algorithm when X=3.
[4 marks]

Continued.....

(b) Given the network link in Figure Q2 (b) below, complete **node A** routing table if the routing is using Bellman-Ford routing algorithm.

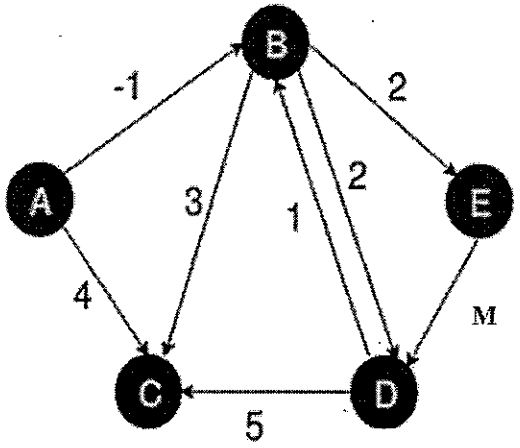

Figure Q2b

(i) Complete **node A** routing table if M=-1

[4 Marks]

(ii) Complete **node A** routing table if M=-4

[4 Marks]

(iii) Are both Q2b (i) and (ii) routing converged into a stable state. If not, explain how to prevent routing loop.

[3 Marks]

Continued.....

Question 3

(a)

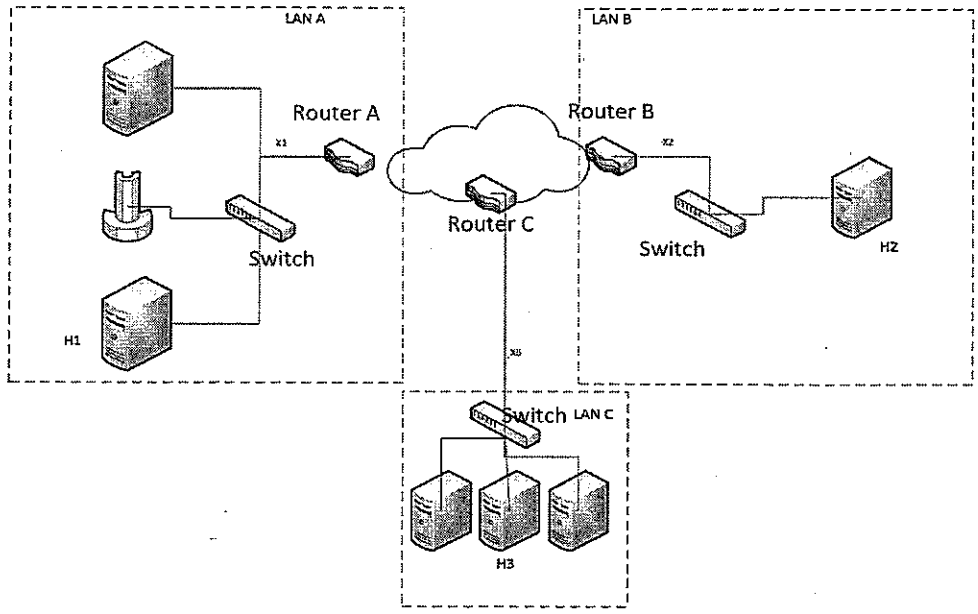

Figure Q3(a)

Figure Q3(a) above shows three Local Area Networks (LANs) that are interconnected by routers A, B and C. Subnetting is not implemented. Given that the Internet Protocol (IP) addresses interface **X1** of router A, and interface **X2** of router B is 188.121.121.2 and 80.121.121.3, respectively. The IP address of host **H3** is found in LAN C as 218.121.121.4.

Determine the IP address and address class for the following:

(i) LAN A network

[2 marks]

(ii) LAN B network

[2 marks]

(iii) LAN C network

[2 marks]

(iv) Host H1 with host ID of 1110_2.

[2 marks]

Continued.....

(b) Discuss the 4 main differences between logical addressing and port addressing.
[4 marks]

(c) A company with a CIDR IP addresses of 188.188.2.0/24 needs at least 6 subnets. Deduce the maximum number of hosts in a new subnets, and find the subnet mask required. How many remaining subnets can the company utilized?
[4 marks]

(d) A medium-size organization with a large block address (202.188.1.0/24) is split into one small-size company using the block address (202.188.1.0/25) and two remote organization within the company.

i) If the first small-size company uses the block (202.188.1.0/25). How many subnets available now. How many hosts can the small-size company assigned/allocated? Justify your answer.
[3 marks]

ii) What is the remaining block of IP address that can be used by the remote organization? If the company decided to subnet 202.188.1.128/25 into two further subnets for two remote companies, how can you do it. Justify your answer.
[3 marks]

iii) Explain how the datagrams destined for the two remote organization can be correctly routed to these companies if their address blocks still are part of original company.
[3 marks]

Continued.....

Question 4

(a)

(i) Describe the main role of the communication layer, the network-wide state-management layer, and the network-control application layer in an SDN controller.

[4 Marks]

(ii) Suppose you wanted to implement a new routing protocol in the SDN control plane. At which layer would you implement that protocol? Explain.

[2 Marks]

(b)

(i) Why are different inter-AS and intra-AS protocols used in the Internet.

[3 Marks]

(ii) What is meant by an area in an OSPF autonomous system.

[2 Marks]

(iii) Why was the concept of an area introduced?

[2 Marks]

(c) Describe both, public-key and symmetric-key encryption.

[6 Marks]

(d) With the aid of diagrams, discuss the differences between filter-based firewall and proxy-based firewall.

[6 Marks]

End of Paper